SUBSTANCE USING ADOLESCENTS ADMITTED TO INPATIENT TREATMENT: CHARACTERISTICS AND FACTORS ASSOCIATED WITH LENGTH OF TIME IN TREATMENT

Running title: Adolescents in inpatient substance use treatment

ALEXANDRE QUELHO COMANDULE, MD (Clinical Lecturer)[1,2], MARIA DE FATIMA RATO PADIN, Ph.D. (Research Associate)[2.3], MARTHA CANFIELD (Research Associate)[4], RONALDO LARANJEIRA (Professor), MD, Ph.D.[2,3]

[1] Santa Casa de Misericordia de Sorocaba, Sorocaba, São Paulo. Brazil
[2] National Institute of Public Policy for Alcohol and Other Drugs, São Paulo Brazil
[3] Department of Psychiatry, Federal University São Paulo, São Paulo, Brazil
[4] Health Psychology Section, Psychology Department, Institute of Psychiatry, Psychology and Neuroscience, King's College London, London, UK

Correspondence to:
Alexandre Quelho Comandule,
Department of Psychiatry
Santa Casa de Misericordia de Sorocaba
Av. São Paulo, 750 - Jardim Árvore Grande
Sorocaba, 18013-000
Brazil
E-mail: aquelho@gmail.com

ABSTRACT

Studies of adolescents receiving inpatient substance use treatment remains limited. We explored the characteristics of adolescents who received substance use treatment as an inpatient in a psychiatric hospital in Brazil and factors associated with length of time in this treatment. **Methods:** A retrospective observational study was performed. Electronic treatment records of 172 young people (aged 17 and below) receiving substance use treatment at Hospital Lacan in Brazil were analysed. **Results**: The mean age of participants was 15.18 years (SD=.39). The sample was characterised as predominately male (68.60%), who entered treatment involuntarily (80.81%), were out of school (89.82%), were involved with criminal justice (59.88%) and came from a family with substance using problems (74.67%). Re-admission to inpatient treatment for substance use problems was common. On average, adolescents received inpatient treatment for 3 months. Length of time in treatment was associated with: entering treatment involuntarily, re-admission to inpatient treatment, requests of discharge from treatment by a relative/carer, education level, left school due to aggressive behaviours and use of cocaine. **Conclusion:** Findings highlight the complex profiles of adolescents receiving substance use treatment in Brazil. Cross system collaboration between mental health, educational and justice services are needed to treat adolescents' substance use.

Key words: adolescents, inpatient treatment, substance use

INTRODUCTION

Despite emerging evidence of downward shift in substance use among young people in some countries (Broadfiled, 2017; Dennis & Scott, 2007; Miech, Johnston, O'Malley, Bachman & Schulenberg, 2016; Plettinckx et al., 2014) treatment admissions for adolescents with alcohol and other substance use disorders continue to increase (Roxburgh & Burns, 2013). In Brazil, it is estimated a high prevalence of substance use among adolescents: 42.4% of alcohol, 9.6% of tobacco and 25.5% of illicit substances (Carlini et al., 2010; Malta et al., 2011). Cannabis and inhalants/solvents are the most used illicit substance among Brazilian adolescents (Carlini et al., 2010; Madruga et al., 2012). According to the latest national survey on crack-cocaine use in Brazil, young people under the age of 18 years old accounts for approximately 14% of regular crack-cocaine users (Bastos & Bertoni, 2014). Presently, there is no available data related to the prevalence of adolescents receiving substance use treatment in Brazil (Vasters & Pillon, 2011). Evidence from the international literature suggests that adolescents may be relatively less likely to seek treatment than adults (Cornelius et al., 2003; Sussman, Skara & Ames, 2009; Winters, Tanner-Smith, Bresani & Meyers, 2014). Figures from the US shows that only 10% of adolescents with substance use problems are admitted to treatment (Substance Abuse and Mental Health Services Administration, 2013).

In line with other countries, attempts have been made in Brazil to provide treatment services that recognize the stage of psychological and physical development (Castellanos-Ryan, O'Leary-Barret & Conrod, 2013; Winters et al., 2014) and specific problems in family functioning that might be

associated to the adolescent's substance use (Bertrand et al., 2013; Coatsworth et al., 2001). However, it remains common to adolescents to be integrated into programmes that are merely modifications of adults' programmes. There is a clear consensus in the Brazilian and international literature that adolescent-only services represent a minimum threshold of substance use treatment quality (Lopes, Nobrega, Del Prette & Scivoletto 2013; NIDA, 2014), and that differences in treatment adherence and outcomes are largely explained by individual client characteristics (Knudsen, 2009). Currently, there is a great demand in Brazil for substance use treatments that are tailored to the needs of substance using adolescents. Information about the characteristics of those Brazilian adolescents receiving inpatient treatment for substance use, and possible associations with services outcomes, is lacking.

The purpose of our study is to begin to address these issues by describing the characteristics of adolescents who received substance use treatment as an inpatient in a psychiatric hospital in Brazil. Since prior research has revealed that duration in inpatient programs is associated with treatment outcomes, including relapse once they return to their natural environment (Battjes, Gordon, O'Grady, Kinlock, & Carswell, 2003; Chung & Maisto, 2006), a second objective of this study was to identify factors associated with the length of time receiving inpatient treatment. Evidence suggests that the length of treatment varies according to the severity of the adolescent's substance use problem (Battjes, Gordon, O'Grady, & Kinlock, 2004; Winters et al., 2018). Severe substance use dependence among young people has been associated with a variety of complex forces, including family

functioning, deviant peers and school problems (Serrano et al., 2018; Svensson, 2000; Sussman, Skara, & Ames, 2009). Research into factors associated with length of time in inpatient treatment in hospitals among adolescents is limited. We hope that this study will provide a starting point for implementing comprehensive, targeted, and tailored programs for adolescents with substance use problems in Brazil, while at the same time shedding light to the international literature on which factors are associated with the duration of inpatient substance use treatment among adolescents.

METHODS

A retrospective observational study was performed. Data came from service records of 172 young people (aged 17 and below) referred to Lacan's Psychiatric Hospital in the city of Sao Paulo, between 2014 to 2016. This treatment facility is run by a partnership between the Brazilian Public Health System (SUS) and philanthropic funding, which provides free of charge inpatient care (i.e., psychiatric, psychological and occupational care) for young and adult populations with psychiatric disorders, including substance use dependence. Data of all young patients that were referred to Lacan due to substance use problems with/without other psychiatric problems were analysed in this study. Patients might have entered the treatment voluntary or involuntary (referrals and pressures from families or the criminal justice system). The substance use service at Lacan is designed to promote substance abstinence, diagnostic elucidation, and establishment or optimization of medication. As part of the medical intervention, patients at Lacan receive counseling and family group sessions. Patients are not allowed

to leave the service; not even to attend educational classes. After hospitalization, patients are referred to the available mental health network in the cities where they come from. Ethical approval to conduct this study was granted by the Federal University of Sao Paulo. Anonymised data was released to the research team by the hospital data management, protecting the privacy and confidentiality of patients.

Assessments

All data were collected as part of routine assessment and treatment of adolescents at Lacan's hospital.

Socio-demographic characteristics: Information on participant´s age, gender, and educational level at the time they entered treatment was collected at first contact with the service. If not attending school at the time of admission, reason for absence was asked. Information about whom the patient resided with (i.e., mothers only, grandparents, out of family home) was also collected.

Treatment characteristics: Treatment variables included how many days in treatment, and whether discharge from current treatment was given by the service or a request from a relative/carer, both of which are routinely recorded by the service. Information about how the patient entered treatment (i.e., voluntary and involuntary – due to referrals and pressures from schools, families, or the criminal justice system), number of times admitted to inpatient treatment and length of time since previous treatment was assessed at the first clinical assessment.

Clinical characteristics: Primary ICD-10 diagnosis is routinely recorded in a structured field. Data was extracted for all those patients with substance use

problem as primary or secondary diagnosis. Information about pattern of substance use was extracted from the first clinical assessment - or in some cases during first or second consultation with the clinical psychologist - using a structured instrument designed by the service. This includes questions about types of substances used and frequency of use (i.e., sporadic, almost every day, daily, once a day, twice a day). Participants were coded as using a specific substance daily if they reported using at any frequency every day. Participants were also asked to report age of onset for licit and illicit substances and whether he/she was aware of substance use problems among other family members. Participants were coded as having a history of a mental health disorder before treatment admission where this was indicated in the first clinical assessment. Reports of mental heath disorder at treatment admission was coded for participants who indicated a mental health disorder not necessarily associated with substance use in the ICD-10.

Criminal characteristics: Criminal justice variables included history of involvement with the criminal justice, drug trafficking and theft to sustain substance use practices. All this information was assessed at first contact with the service using a structured instrument designed by the service.

Data Analysis

Descriptive statistics were calculated using frequencies and percentages for categorical data, means and standard deviations for continuous data. An ordinal variable for *length of time in treatment* ranging from 1 to 5 was created according to the following days in treatment: up to 30 days; 31 to 60 days; 61

to 90 days; 91 to 120 days; 121 to 255 days. The median and interquartile range was calculated. Factors associated with length of time in treatment were considered using ordinal logistic models. Odds ratios (OR) and 95% confidence intervals (CI) of unadjusted and adjusted (controlling for participant's age and gender) models are reported.

RESULTS

The mean age of participants was 15.18 years (SD=1.39). The majority of participants was male (68.60%), entered treatment involuntarily (80.81%) and were out of school at the time of admission (89.82%). Of those who were not at school, 62.18% reported substance use as the reason for being out. Almost all patients were referred to continued care post inpatient treatment: 54.01% to addiction services; 25.00% to children & adolescents services; and 19.02% to mental health services. Reports of history of involvement with criminal justice were high (59.88%). Re-admission to inpatient treatment was common (38.36%) and it took an average of 3 years for re-entering. The following characteristics were also commonly reported: mental health disorder at the time of admission (25.00%; the most common mental health disorders reported includes attention deficit hyperactivity disorder and mood disorders), involvement in drug trafficking (37.87%) and theft (22.10%) and reports of living with their mother (41.52%). Three quarter of the sample reported to have a family relative with substance use problems (74.67%) and that this relative was a close family member (75.89%).

Nearly all participants reported to use cannabis (97.09%) and to use it daily (89.51%). The use of alcohol and tobacco were also highly reported

(88.37% and 78.49%, respectively). Over a quarter of those who reported to drink alcohol, consume it everyday (28.94%). A large proportion of the sample reported to use cocaine (80.81%) and to use it daily (71.94%). Over a quarter of the sample reported to use crack-cocaine (29.07%) and, of those who reported to use this substance, 72% used it daily. The average age of substance use onset was 12.03 (SD=1.72) years old.

Variables associated with length of time receiving inpatient substance use treatment

The number of days in treatment ranged from 2 to 255, with a median of 61 to 90 days (IQR=31 to 60 days). Univariate analysis (Table 1) revealed that the likelihood of lower length of time in treatment was associated with requests of discharge from treatment by a relative/carer, higher educational level and living with the mothers. Yet, greater length of time in treatment was associated with being female, entering treatment involuntarily, re-admission to inpatient treatment, being out of school due to aggressive behaviours, living out of family home and cocaine use.

After controlling for participants age and gender, the following variables remained associated with length of time in treatment: entering treatment involuntarily, re-admission to inpatient treatment, requests of discharge from treatment by a relative/carer, education level, left school due to aggressive behaviours and use of cocaine.

INSERT TABLE 1 HERE

DISCUSSION

This study shows that substance use problems in a cohort of Brazilian adolescents attending inpatient substance use treatment in a psychiatric hospital is associated with a wide range of problems. The majority of participants were out of school, had previous involvement with the criminal justice system, entered treatment involuntary and came from substance using families. Re-admission to inpatient substance use treatment was common as was involvement in drug trafficking. Although the majority of adolescents lived with one/both biological parents, nearly a quarter of the sample lived out of the family home (i.e., in the streets and criminal rehabilitation centers). Nearly all participants reported using alcohol and tobacco. Cannabis was the most used illicit substance. Nearly all participants also reported to use cocaine. The use of crack-cocaine was common and, of those who reported using this substance, nearly three-quarters consumed it daily. The average age of substance use onset was 12 year old. Our results extend findings from studies conducted elsewhere suggesting that adolescents receiving inpatient treatment have severe substance use problems, high rates of relapse as well as family, school and legal problems (Battjes et al., 2003; Chung & Maisto, 2006).

On average, adolescents in our study received inpatient treatment for 3 months (61 to 90 days), which is a significantly higher number than the international recommendation of up to 30 days for adolescents (Paino, Aletraris & Roman, 2015). Reasons for this is unclear, but the fact that Lacan's hospital is partly supported by philanthropic funding allows for more flexibility regarding length of time than those services run by the Brazilian Public Health System. Moreover, 80.0% of our sample entered treatment

involuntary (due to referrals and pressures from families or the criminal justice system). Lack of motivation and readiness for treatment might have imposed additional barriers to begin to change adolescents' behaviours and engage in treatment (Battje et al., 2003; Battje et al., 2004; Mensinger et al., 2006; Paino et al., 2015). Higher length of time in treatment in our study was associated with being female, entering treatment involuntary, re-admission to inpatient treatment, lower levels of schooling, not living with the biological mother, living out of the family home, having a substance using relative in the family and use of cocaine. Prior studies have shown that adolescents who stayed in residential treatment longer were likely to have more favorable outcomes (Chung & Maisto, 2006; Knudsen, 2009). It is not clear, however, whether the direction of this association is the same among adolescents receiving inpatient treatment in a psychiatric hospital. It is important to note that the substance use treatment delivered at Lacan's hospital focus on substance use problems only. Approaches designed to integrate other elements of the social context of the adolescents including, for example, educational support is lacking at the service. It is well established in the literature that disengagement and school failure might increase social rejection at school, which in turn might increase associations with off-school deviant peer groups, substance use, low academic achievement, and developing problems with law later in life. (Bachman et al., 2008; Henry, Knight & Thornberry, 2012; Li & Lerner, 2011) Moreover, drug-using peers and academic challenges have been identified as relapse-risk factors for youth after drug treatment (Clark & Winters, 2002; Svensson, 2000). Our findings draw attention to the importance of considering variation in terms of educational needs as well as

psychological problems and family functioning of the adolescents. An important avenue for future studies would be to investigate the relevance of these risk factors with post-drug treatment outcomes in adolescents. Information about these risk factors holds promise for conducting comprehensive assessments that might influence timing and type of interventions to be delivered.

Another finding that requires further investigation is the average of 3 years for those who had attended inpatient treatment in the past to be re-admitted to substance use treatment. Studies of relapse involving adolescent who have been admitted to inpatient programmes suggest that one out of three adolescents who relapse to any pattern of substance use post-treatment, return to heavy use or to pre-treatment level of substance involvement through 1 to 2 year follow-up (Myers, Brown, & Mott, 1995; Winters, Stinchfield, Opland, Weller & Latimer, 2000). While our variable only allows speculation regarding the relapse characteristics, it signals the need to assess relapse points in adolescents' post-treatment recovery and possible mechanisms that may underlie these change points. Empirical work is needed to determine how development specific life events, contextual influences and life stage issues may influence substance use relapse among adolescents in Brazil. The integration of relapse into treatment frameworks should be map onto the process by which relapse occurs (Chung & Maisto, 2006) and procedures for consistent monitoring of adolescents trajectories aftercare should be put in place.

Our findings also highlight the need for robust national guidelines on a continued care model for adolescents in Brazil. Our data suggests a lack of

consistence on referral to continued care post-inpatient substance use treatment, as some adolescents are referred to addiction services, others for mental health services and some for children and adolescents' services. The evidence that the majority of participants who have been re-admitted to inpatient treatment due to problems following outpatient treatment, demonstrates the urgency for approaches focusing on concrete behavioral issues aimed at improving linkage, retention and adherence to continued care among adolescents. This could include, for example, defining which type of service adolescents with substance use problems should be referred to, development of a multifaceted treatment approach delivered by qualified staff that addresses all aspects of the adolescents life (e.g., school, home, and public activities) (Kelly, Myers & Brown, 2000; Winters et al., 2014) and provide outreach approaches to continued care that facilitates adolescents and their families involvement in the programmes (e.g. home visits and telephone calls).

Limitations of our study include the relatively small sample size, which might have affected the representative of our findings and the association between variables in the regression analysis. Comparisons between length of time in treatment and each type of substance used were not possible due to considerable overlap between groups according to type of substance used. Although reports of mental health disorder were recorded, it was not possible to obtain accurate details regarding the diagnosis due to reporting bias on the electronic records. For example, the initial clinical assessment was conducted by consultant clinical psychiatrics specialised in adult populations. This meant common problems usually reported in children/adolescents such as

behavioural and emotional problems, were under reported. In addition, the fact that participants were only recruited from one psychiatric hospital means that results cannot be generalized to adolescents receiving inpatient substance use treatment across the country. Lastly, the relationships we observed between variables and length of time in treatment are only correlational and do not provide the basis to identify the source or direction of influence.

Conclusion

The findings highlight the multiple and complex profile of adolescents with substance use problems in Brazil. Our findings point to the need to develop approaches for cross system collaboration, which include mental health, educational and justice services. Given the high length of time receiving inpatient treatment and lack of a model of continuing care post-inpatient treatment, this study provides evidence that warrant consideration in the design of protocols to support adolescents trying to negotiate their problematic profiles during their recovery.

Declaration of Interest.

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of this paper.

REFERENCES

Bachman, J., O'Malley, P. M., Schulenberg, J. E., Johnston, L., Freedman-Doan, P. & Messersmith, E. E. (2008). *The Education–Drug Use Connection: How Successes and Failures in School Relate to Adolescent Smoking,*

Drinking, Drug Use, and Delinquency. New York: Lawrence Erlbaum Associates. Retrieved at: http://www.psc.isr.umich.edu/pubs/abs/4465

Bastos, F. I., & Bertoli, N. (2014). *Pesquisa Nacional sobre o uso de crack: quem são os usuários de crack e/ou similares do Brasil? Quantos são nas capitais brasileiras?* Rio de Janeiro: Fundação Oswaldo Cruz. Retrieved at: https://www.icict.fiocruz.br/sites/www.icict.fiocruz.br/files/Pesquisa%20Nacional%20sobre%20o%20Uso%20de%20Crack.pdf

Battjes, R. J., Gordon, M.S., O'Grady, K.E., Kinlock, T.W. & Carswell, M.A (2003). Factors that predict adolescent motivation for substance abuse treatment. *Journal of Substance Abuse Treatment, 24,* 221-32. doi: 10.1016/S0740-5472(03)00022-9.

Battjes, R. J., Gordon, M.S., O'Grady, K.E. & Kinlock T. W. (2004). Predicting retention of adolescents in substance abuse treatment. *Addictive Behaviours, 29,* 1021-1027. doi:10.1016/j.addbeh.2004.02.054.

Bertrand, K., Richer I., Brunelle, N., Beaudoi, I., Lemieux A. & Menard J. (2013). Substance Abuse Treatment for Adolescents: How are Family Factors Related to Substance Use Change? *Journal of Psychoactive Drugs, 45*, 28-38. doi: 10.1080/02791072.2013.763560

Broadfiled D. (2017). *Drug Misuse: Findings from the 2016/17 Crime Survey for England and Wales Statistical Bulletin 11/17*. London: Home Office. Retrieved at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/642738/drug-misuse-2017-hosb1117.pdf

Carlini, E. L. A., Noto, A. R., Sanchez, Z. M., Carlini, C. M. A., Locatelli, D. P. & Abeid, L. R. (2010). *VI Levantamento Nacional sobre o Consumo de Drogas Psicotrópicas entre Estudantes do Ensino Fundamental e Médio das Redes Pública e Privada de Ensino nas 27 Capitais Brasileiras*. São Paulo:

Centro Brasileiro de Informações sobre Drogas Psicotrópicas, SENAD - Secretaria Nacional de Políticas sobre Drogas.

Chung, T. & Maisto, S. A (2006). Relapse to alcohol and other drug use in treated adolescents: Review and reconsideration of relapse as a change point in clinical course. *Clinical Psychology Review, 26,* 149-161. doi: 10.1016/j.cpr.2005.11.004

Clark, D. & Winters, K. C. (2002). Measuring risks and outcomes in substance use disorders prevention research. *Journal of Consulting and Clinical Psychology, 70*, 1207–1223. doi: 10.1037/0022-006X.70.6.1207

Coatsworth, J. D., Santisteban, D. A., McBride, C. K. & Szapocznik J. (2001). Brief strategic family therapy versus community control: Engagement Retention, and an Exploration of the Moderating Role of Adolescent Symptom Severity. *Family Process, 40*, 313-332. doi: 10.1111/j.1545-5300.2001.4030100313.x

Cornelius, J. R., Maisto, S. A., Pollock, N. K., Martin, C. S., Salloum, I. M. & Lynch, K. G. (2003). Rapid relapse generally follows treatment for substance use disorders among adolescents. *Addictive Behaviors*, *28*, 381–386. doi: 10.1016/S0306-4603(01)00247-7.

Dennis, M. & Scott, C. K. (2007). Managing Addiction as a Chronic Condition. *Addiction Science & Clinical Practice, 4,* 45-55.

Flanzer, J. (2005). The Status of Health Services Research on Adjudicated Drug-Abusing Juveniles: Selected Findings and Remaining Questions. *Substance Use & Misuse, 40,* 887-911. doi: 10.1081/JA-200058862

Kelly, J. F., Myers, M.G. & Brown, S.A. (2000). A Multivariate Process Model of Adolescent 12-Step Attendance and Substance Use Outcome Following Inpatient Treatment. *Psychology of Addictive Behaviors, 14,* 376-389.

Henry, K. L., Knight, K. E. & Thornberry, T. P. (2012). School Disengagement

as a Predictor of Dropout, Delinquency, and Problem Substance Use during Adolescence and Early Adulthood. *Journal of Youth Adolescent, 41*, 156-166. doi: 10.1007/s10964-011-9665-3.

Knudsen, H.K. (2009). Adolescent-only substance abuse treatment: availability and adoption of components of quality. *Journal of Substance Abuse & Treatment, 36*, 195-204. doi: 10.1016/j.jsat.2008.06.002.

Li, Y. & Lerner, R. M. (2011). Trajectories of school engagement during adolescence: Implications for grades, depression, delinquency, and substance use. *Developmental Psychology, 47*, 233-247. doi: 10.1037/a0021307

Lopes, G. M., Nobrega, B. A., Del Prette, G. & Scivoletto, S. (2013). Use of psychoactive substances by adolescents: current panorama. *Revista Brasileira de Psiquiatria, 35,* S51-S61. doi: 10.1590/1516-4446-2013-S105.

Madruga, C., Laranjeira, R., Caetano, R., Pinsky, I., Zaleski, M. & Ferri, C. P. (2012). Use of licit and illicit substances among adolescents in Brazil — A national survey. *Addictive Behaviours, 37, 1171*- 1175. doi: 10.1016/j.addbeh.2012.05.008.

Malta, D. C., Mascarenhas, M. D. M., Porto, D. L., Duarte, E. A., Sardinha, L. M., Barreto, S. M. & Neto, O. L. M. (2011). Prevalência do consumo de álcool e drogas entre adolescentes: Análise dos dados da Pesquisa Nacional de Saúde Escolar. *Revista Brasileira de Epidemiologia, 14,* 136–146.

Mensinger, J. L., Diamond, G. S., Kaminer Y. & Wintersteen, M. B. (2006). Adolescent and Therapist Perception of Barriers to Outpatient Substance Abuse Treatment. *American Journal on Addictions, 15,*16–25.

Miech, R. A., Johnston, L. D., O'Malley, P. M., Bachman, J. G. & Schulenberg, J. E. (2016). *Monitoring the future national survey results on drug use, 1975–2015: Volume I, secondary school students*. Ann Arbor, MI: Institute for Research for Social Research, The University of Michigan.

Myers, M. G., Brown, S. A. & Mott, M. A. (1995). Preadolescent conduct disorder behaviors predict relapse and progression of addiction for adolescent alcohol and drug abusers. *Alcohol Clinical Experiment Research, 19,* 1528 – 1536. doi: 10.1111/j.1530-0277.1995.tb01019.x.

Paino, M., Aletraris, L. & Roman, P. M. (2015). Organizational Predictors and Use of Evidence-Based Practices in Adolescent Substance Abuse Treatment. *Substance Abuse, 36,* 462–469. doi: 10.1080/08897077.2014.960959.

Plettinckx, E., Antoine, J., Blanckaert, P., De Ridder, K., Vander Laenen, F., Laudens, F., Casero, L. & Gremeaux, L. (2014*). Belgian National Report on drugs 2014, New Developments and Trends*. Brussels: Belgian Monitoring Center for Drugs and Drugs Addiction. Retrieved at: http://www.emcdda.europa.eu/system/files/publications/1004/BAR2014%20Final%20EMCDDA%20Version.pdf

Roxburgh, A. & Burns, L. (2013). *Drug-related hospital stays in Australia 1993–2013.* Sydney: National Drug and Alcohol Research Centre. Retrieved at: https://ndarc.med.unsw.edu.au/sites/default/files/ndarc/resources/NIDIP%20Bulletin%20-%20Drug-related%20hospital%20stays%20in%20Australia%201993-2013.pdf

Serrano, M. B., Al-Halabí, S., Burón, P., Garrido, M., Díaz-Mesa, E.M., Galván, G.,… Bobes J. (2018). Predictive factors of alcohol consumption in adolescents: data from 1-year follow-up prospective study. *Adicciones.* Advance publication online. doi: 10.20882/adicciones.998.

Substance Abuse and Mental Health Services Administration. (2013). *Results from the 2012 national survey on drug use and health: Summary of national findings*. Rockville, MD: National Institutes of Health.

Svensson, R. (2000). Risk factors for different dimensions of adolescent drug use. *Journal of Child & Adolescent Substance Abuse, 9*, 67–90. doi: 10.1300/J029v09n03_05.

Sussman, S., Skara, S. & Ames, S. L. (2009). Substance abuse among adolescentes. *Substance Use & Misuse, 43,* 1802-1828. doi: 10.1080/10826080802297302.

Vasters, G.P. & Pillon S. (2011). O uso de drogas por adolescentes e suas percepções sobre adesão e abandono de tratamento especializado. *Revista Latino-Americana de Enfermagem, 19.* doi: 10.1590/S01041169201100020013.

NIDA. (2014). *Principles of Adolescent Substance Use Disorder Treatment: A Research-Based Guide*. Rockville, MD: National Institutes of Health. Retrieved at https://d14rmgtrwzf5a.cloudfront.net/sites/default/files/podata_1_17_14.pdf

Winters, K. C., Botzet, A. M., Stinchfield, R., Gonzales-Castaneda, R., Finch, A. J., Piehler, T. F., … Hemze, A. (2018). Adolescent Substance Abuse Treatment: A Review of Evidence-Based Research. In C. G. Leukefeld & T. P. Gullotta (Eds.). *Adolescent Substance Abuse. Evidence-Based Approaches to Prevention and Treatment.* (pp. 141-171). New York, NY: Springer Science

Winters, K. C., Stinchfield, R. D., Opland, E., Weller, C. & Latimer, W. W. (2000). The effectiveness of the Minnesota Model approach in the treatment of adolescent drug abusers. *Addiction, 95,* 601-612. doi: 10.1046/j.1360-0443.2000.95460111.x.

Winters, K. C., Tanner-Smith, E. E., Bresani, E. & Meyers K. (2014). Current advances in the treatment of adolescent drug use. *Adolescent Health, Medicine Therapeutics, 5,* 199-210. doi: 10.2147%2FAHMT.S48053

Table 1. Univariate factors associated with the length of time receiving inpatient treatment (N=172)

Variables	N (%)	Unadjusted OR (95%CI)	Adjusted OR (95%CI)[a]
Gender (male= 0)	118 (68.60)	**1.82 (1.08, 3.06)***	-
Age (Mean SD)	15.18 (1.39)	(.78, 1.34)	-
Treatment Variables			
Involuntarily admission [1]	139 (80.81)	**2.41 (1.21, 4.80)***	**3.06 (1.41, 6.67)***
Re-admission to inpatient substance use treatment	66 (38.36)	**1.87 (1.07, 3.28)***	**1.90 (1.08, 3.32)***
Number of previous inpatient treatment received (Mean SD)	1.45 (.70)	1.45 (.92, 2.27)	1.48 (.92, 2.38)
Number of years since last inpatient treatment (Mean SD)	3.21 (.90)	.75 (.48, 1.17)	.74 (.47, 1.16)
Reason for re-admission			
Did not accept abstinence approach	11 (16.67)	.92 (.26,3.20)	1.38 (.35, 5.46)
Did not want to follow post-treatment approaches	34 (51.51)	2.17 (.79, 5.95)	1.84 (.59, 5.68)
Relapse	12 (18.18)	.35 (.11, 1.17)	.38 (.11, 1.29)
Discharged from treatment requested by a relative/carer	13 (7.56)	**.01 (.00, .03)****	**.01 (.00, .02)****
Continuing care post inpatient treatment			
Referral to mental health services	33 (19.02)	.95 (.47, 1.91)	1.05 (.51, 2.10)
Referral to addiction services	93 (54.01)	.87 (.51, 1.50)	.83 (.47, 1.47)
Referral to children & adolescents services[2]	43 (25.00)	1.28 (.70, 2.33)	1.24 (.66, 2.30)
Psychological variables			
History of mental health disorder before treatment admission	19 (11.5)	.51 (.19, 1.31)	.49 (.19, 1.61)
Report of mental health disorder at treatment admission [3]	43 (25.00)	1.12 (.59, 2.12)	1.26 (.66, 2.41)
Educational variables			
Higher educational level (primary school=0)	97 (58.79)	**.68 (.49, .95)***	**.62 (.44, .89)***
Out of school[4]	150 (89.82)	.80 (.34, 1.90)	.81 (.34, 1.94)
Out of school due substance use	74 (49.33)	.88 (.44, 1.72)	.85 (.43, 1.68)
Out of school due aggression	11 (7.33)	**3.42 (1.10, 10.61)***	**3.42 (1.01, 9.87)***
Criminal variables			
History of involvement with criminal justice	103 (59.88)	1.24 (.71, 2.16)	1.47 (.83, 2.61)
History of attending youth offending unit	39 (37.86)	.78 (.38, 1.60)	.71(.34, 1.51)
Involvement in drug trafficking to sustain drug use	65 (37.87)	1.06 (.58, 1.92)	1.16 (.62, 2.18)
Involvement in thief to sustain drug use	38 (22.10)	.88 (.44. 1.75)	.99 (.49, 2.01)
Family			
Live with			
Mother with/without siblings	71 (41.52)	**.56 (.32, .97)***	.62 (.35, 1.12)
Father with/without siblings	13 (7.60)	1.72 (.67, 4.42)	1.58 (.62, 4.50)
Grandparents with/without siblings	16 (9.36**)**	1.32 (.54, 3.19)	1.21 (.49, 2.99)
Both parents	36 (21.05)	.80 (.39, 1.62)	.83 (.40, 1.70)
Out of home[5]	35 (20.47)	**1.91(1.01, 3.65)***	1.59 (.81, 3.15)
Substance use problem among family members	112 (74.67)	**2.38 (1.20, 4.76)***	**2.15 (1.06, 4.37)***
Close relative substance user (mother/father/siblings)	85 (75.89)	**2.71 (1.08, 6.80)***	**2.61 (1.02, 6.65)***
Substance Use variables			
Alcohol use	152 (88.37)	.62 (.23, 1.84)	. 82 (.24, 2.79)
Alcohol use daily	44 (28.94)	1.31 (.68, 2.51)	1.22 (.63, 2.35)
Tabaco use	135 (78.49)	1.35 (.69, 2.62)	1.29 (.66, 2.50)
Tabaco use daily	124 (91.85)	.99 (.99, 1.01)	.99 (.99, 1.00)
Cannabis use	167 (97.09)	.87 (.17, 4.52)	.93 (.17, 4.97)
Cannabis use daily	128 (76.64)	1.65 (.62, 4.39)	1.60 (.61, 4.26)
Cocaine use	139 (80.81)	**2.31 (1.13, 4.72)***	**2.19 (1.06, 4.53)***
Cocaine use daily	100 (71.94)	.87 (.42, 1.80)	1.26 (.49, 2.16)
Crack-cocaine use	50 (29.07)	1.25 (.69, 2.26)	1.27 (.70, 2.31)
Crack cocaine use diary	36 (72.00)	.81 (.24, 2.72)	.81 (.22, 2.94)
Onset of substance use (Mean SD)	12.03(1.72)	.80 (.59, 1.07)	.81 (.60, 1.10)

Note: numbers in bold significant p values *p<.05, **p<.001. [a] Model adjusted for gender and age. [1]Involuntary includes both family and judicial order. [2] Children & Adolescents services including mental health services target to this population. [3] Mental health disorders not necessarily associated with substance use. [4]Abandonment/expulsion/permanent exclusion/withdrawing/ kicked out of school [5]Residing in orphaned/juvenile retention institution/homeless